UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. L9641

U-TW ROUTE NO. 100

OVER THE

BLACK RIVER

DISTRICT 1 - KOOCHICHING COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 20)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. L9641, Piers 1 and 2, were found to have piling that were in good, sound and firm condition below water. Above water some defects were observed including minor pile checking, splitting, and insufficient pile cap to pile bearing. A moderate accumulation of timber debris was observed between the North Abutment and Pier 2. The channel bottom appeared stable with a noticeable shift in the channel toward the South Abutment since the last inspection.

INSPECTION FINDINGS:

(A) A moderate accumulation of timber debris consisting of up to 1 foot diameter logs and branches was observed between the North Abutment and Pier 2 on and around an island parallel to Pier 2.

(B) There was 1/8 to 1/4 inch wide checking on all piles above water. The bracing of the piles was in good condition with random minor checks around the top connections.

(C) The wingwalls of the North Abutment were found to be leaning backwards about 6 inches causing a separation between the piles and wall planks.

(D) All of the abutment pile caps exhibited minor movement or rotation on the pile tops, and the cap of the South Abutment was not bearing on any piles.

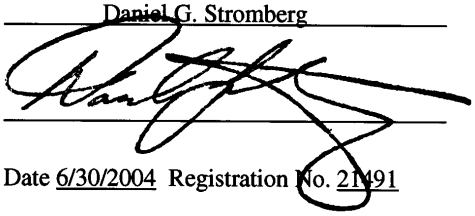
RECOMMENDATIONS:

(A) Monitor drift accumulations, and if found to be increasing, remove during routine maintenance.

(B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

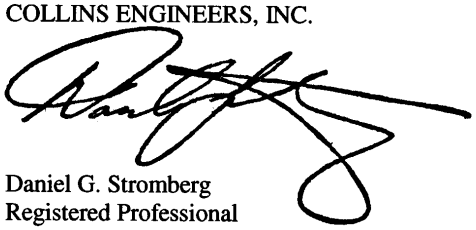
Daniel G. Stromberg



Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: L9641

Feature Crossed: The Black River

Feature Carried: U-TW Route No. 100

Location: District 1 - Koochiching County

Bridge Description: The bridge superstructure consists of three spans of timber deck on multiple timber stringers. The superstructure is supported by two timber pile piers and two timber pile abutments. The piers are numbered 1 and 2 starting from the south end of the bridge. No original design drawings for the bridge were available.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg
State of Minnesota, P.E., No. 21491

Dive Team: Michelle D. Koerbel, Matthew J. Lengyel

Date: August 25, 2002

Weather Conditions: Sunny, ± 85^{o} F

Underwater Visibility: ± 1.0 Foot

Waterway Velocity: Negligible / None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: The piers each consist of four timber piles interconnected with timber cross bracing. Each abutment consists of eight timber piles in front of timber planking forming a breastwall and two skewed wingwalls.

Maximum Water Depth at Substructure Inspected: Approximately 1.0 foot.

4. WATERLINE DATUM

Water Level Reference: The top of pile cap at east end of Pier 1.

Water Surface: The waterline was approximately 10.4 feet below reference. Assumed Waterline Elevation = 89.6.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

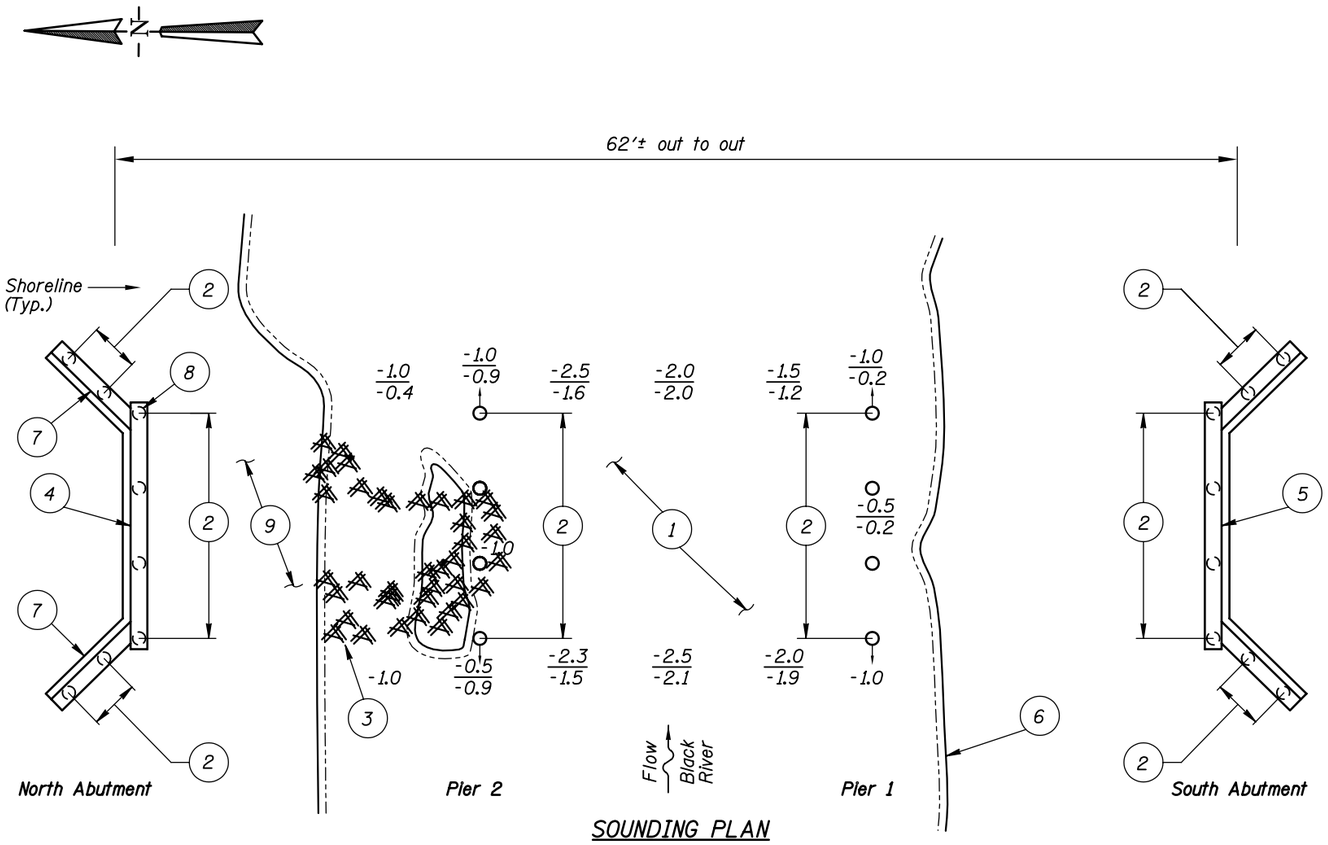
Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/08/02

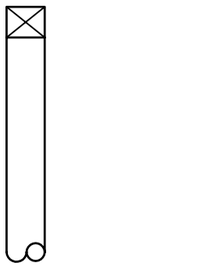
Item 113: Scour Critical Bridges: Code J/95

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

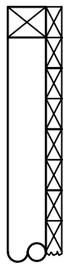
_____ Yes ___X__ No



SOUNDING PLAN



TYPICAL END VIEW OF PIERS



TYPICAL SECTION THROUGH SOUTH ABUTMENT
(North Abutment Opp. Hand)

GENERAL NOTES:

1. Piers 1 and 2 inspected at this bridge.
2. At the time of inspection on August 25, 2002, the waterline was located approximately 10.4 below the top of cap at the east end of Pier 1. Design plans were not available, therefore a reference of 100.0 was assumed. Based on the assumed reference the waterline elevation was 89.6.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at mid and 1/4 point intervals between the substructure units.

INSPECTION NOTES

(1) Channel bottom consisted of sandy clay with maximum probe rod penetration 1 to 1.5 feet.

(2) Random checking on all piles measuring 1/8 to 1/4 inch in width.

(3) Moderate accumulation of timber debris on and around shallow island between the North Abutment and Pier 2, with logs and branches measuring 1 foot in diameter and smaller.

(4) Pile cap movement to north on North Abutment up to 2 inches maximum on the west end.

(5) Pile cap movement on South Abutment, twisted south, causing the cap not to bear on most of the piles.

(6) Minor erosion observed along the south bank.

(7) Wingwalls leaning/shifting backwards at both ends of the North Abutment, with up to 6 inches of movement and separation between piles and wall planks.

(8) A 1-1/2 inch wide split was observed and extended from the top of the pile down 3 feet along the pile.

(9) Up to 2 feet in diameter riprap was observed at the North Abutment.

Legend

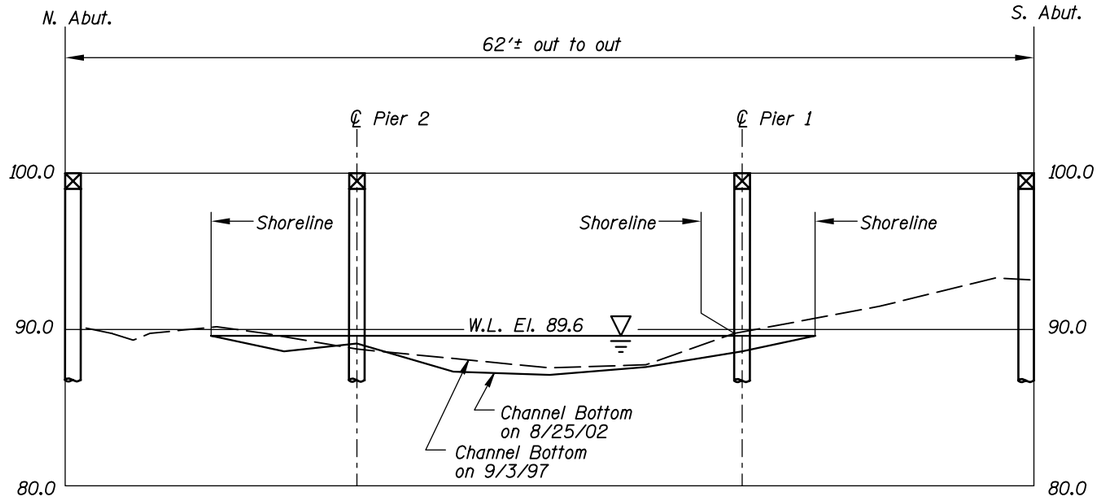
-2.0 / -5.2	Sounding Depth from Waterline (8/25/02) / Sounding Depth from Waterline (9/23/97)
○	Timber Pile
◡	Timber Pile (under cap)
○—	Battered Timber Pile
	Timber Debris

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

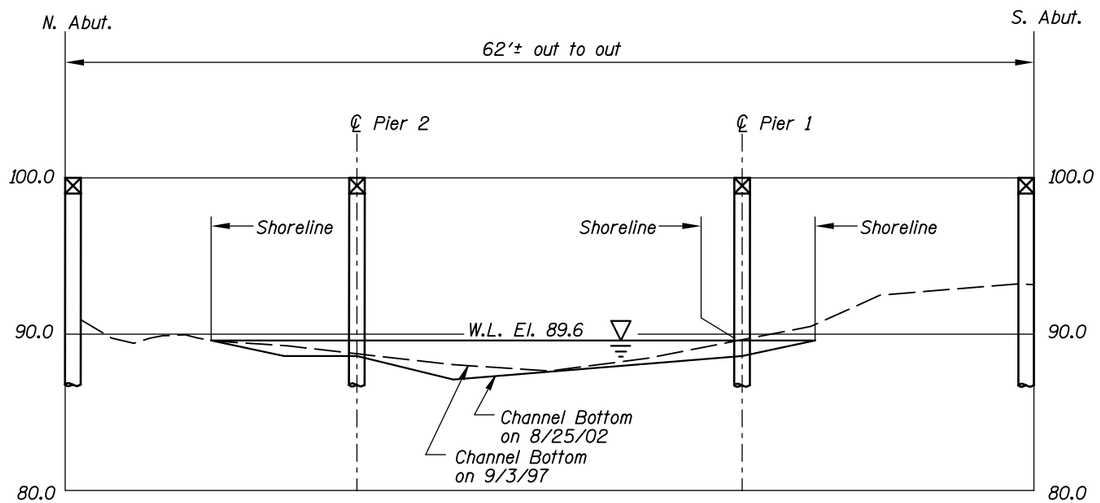
STRUCTURE NO. L9641
OVER THE BLACK RIVER
DISTRICT 1, KOOCHICHING COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120020		Figure No.: 1



UPSTREAM FASCIA PROFILE
Vertical Scale: 1"=10'-0"



DOWNSTREAM FASCIA PROFILE
Vertical Scale: 1"=10'-0"

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. L9641
OVER THE BLACK RIVER
DISTRICT 1, KOOCHICHING COUNTY

UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS (U.O.N.)
Code: 35120020		Figure No.: 2

Photograph 1. Overall View of the Structure, Looking East.

Photograph 2. View of the South Abutment, Looking Southwest.

Photograph 3. View of Pier 1, Looking Southwest.

Photograph 4. View of Pier 2, Looking Northwest.

Photograph 5. View of the North Abutment, Looking Northwest.

Photograph 6. View of Timber Drift Accumulation at Pier 2, Looking East.

Photograph 7. View of Non-Bearing Piles at the South Abutment, Looking South.

Photograph 8. View of Split in the Downstream Pile of the North Abutment, Looking West.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 25, 2002
ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.
BRIDGE NO: L9641 WEATHER: Sunny, "85° F
WATERWAY CROSSED: The Black River
DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
X OTHER Wading due to low water levels
PERSONNEL: Michelle D. Koerbel, Matthew J. Lengyel
EQUIPMENT: Scraper, Lead Line, Sounding Pole, Probe Rod, Awl
TIME IN WATER: 12:10 P.M.
TIME OUT OF WATER: 12:40 P.M.
WATERWAY DATA: VELOCITY Negligible/None
VISIBILITY " 1.0 Foot
DEPTH 1.0 feet maximum at Piers 1 and 2
ELEMENTS INSPECTED: Piers 1 and 2
REMARKS: Overall, the timber piling and bracing of Piers 1 and 2 were in sound and good condition with no significant deterioration or other deficiencies. At both abutments there has been movement of the pile cap and upper backwall timbers, and as previously noted, this has resulted in a nearly complete lack of bearing on all of the piles at the South Abutment. There was a light accumulation of timber drift at Pier 1 and a moderate accumulation around Pier 2 and in the span between Pier 2 and the North Abutment.

FURTHER ACTION NEEDED: _____ YES ___X___ NO

Monitor drift accumulations, and if found to be increasing, remove during routine maintenance.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. L9641
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E. 21491
WATERWAY CROSSED The Black River

INSPECTION DATE August 25, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	±1.0’	7	7	N	9	7	7	8	N	N	7	7	N	N	7	8	N	N
	Pier 2	±1.0’	7	7	N	9	7	7	8	N	N	6	6	N	N	7	8	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the timber piling and bracing of Piers 1 and 2 were in sound and good condition with no significant deterioration or other deficiencies. At both abutments there has been movement of the pile cap and upper backwall timbers, and as previously noted, this has resulted in a nearly complete lack of bearing on all of the piles at the South Abutment. There was a light accumulation of timber drift at Pier 1 and a moderate accumulation around Pier 2 and in the span between Pier 2 and the North Abutment.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.